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ABSTRACT

This paper presents a case and some ideas for integrating basic skills development with occupational training. Explaining why traditional instructional methods do not work in the workplace, the paper summarizes learning theories that support work force literacy programs. It explains how to identify the skills needed in the workplace, provides suggestions on developing a curriculum for workplace learning, and suggests a model for applying the best teaching practices in instruction. Steps in the model are as follows: focus/awareness, modeling, group practice/cooperative learning, independent practice and assessment, and closure. The paper also suggests some program evaluation methods. The paper includes the following information: (1) list of competencies and skills from the report of the Secretary's Commission on Achieving Necessary Skills (SCANS); (2) applications of reading skills in the workplace; (3) applications of writing skills in the workplace; (4) applications of computation and problem-solving skills in the workplace; (5) communication and interpersonal skills in the workplace; (6) a literacy task analysis for auto mechanics; (7) transparency masters for models of instructional techniques and curriculum development; (8) a curriculum outline; (9) sample pages from an automobile mechanics curriculum; (10) a forecast readability exercise; (11) the Cloze Readability Procedure; and (12) a program evaluation model. Twenty references are listed. (KC)

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DEVELOPING LITERACY FOR THE WORKPLACE

AMERICAN VOCATIONAL ASSOCIATION

DECEMBER 10, 1991

Meg Keeley

De La Salle Vocational
Bensalem, PA

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Biographical Sketch

Meg Keeley has been involved in education since 1972 and has worked in job training programs for the past 8 years. She has experience in assessment, instruction, job development, and workforce literacy curriculum development.

Ms. Keeley has served as an officer of the Vocational Education Special Interest Group of the International Reading Association and co-edited that division's newsletter, The Voc Ed Reading Update. She has also served as co-chair of the Workplace Education and Training Division of the PA Association of Adult Continuing Education.

Ms. Keeley has presented workshops and training on workplace literacy for numerous organizations including: American Association for Adult Continuing Education, Wilson College Literacy Corps, Keystone State Reading Association, PA Association for Adult Continuing Education, U.S. Department of Labor, Cosmos Corporation, PA Vocational Education Association, Institute for International Research, National Governors' Association, American Society for Training and Development, American Society for Healthcare Human Resources of the American Hospital Association, American Association of Homes of the Aging, the International Reading Association, The Partnership for Training and Employment, The National Alliance of Business, University of Texas, Austin, and others.

Ms. Keeley has developed Workforce Literacy curriculum at De La Salle Vocational, a day treatment program for court-adjudicated youth. In this project, she worked with ARA Food Services, MAACO Auto Painting and Body Works, Speedy Muffler and Brakes, The Graphic Communications International Union, Thomas Jefferson University Hospital, and other representatives of the Philadelphia business community. She published an article in the October, 90 edition of The Vocational Education Journal which describes this project. As an associate of Performance Plus Learning Consultants, Inc., she co-authored instructional materials for the U.S. Army's Read to Lead program with Jorie Philippi.

DEVELOPING LITERACY FOR THE WORKPLACE:

INTEGRATING BASIC SKILLS WITH OCCUPATIONAL TRAINING

Changes in the workplace are contributing towards a widening gap between the literacy skills of vocational and job training learners and the requirements of the workplace. As a result, there is growing interest in identifying the specific skills needed for the workplace and in learning how instruction in these skills can be developed and implemented in existing occupational education programs.

Why Traditional Instructional Methods Don't Work

Traditional classroom methods have not proven successful in meeting the demands of the workplace. This can be partially explained by the fact that most basic skills are applied differently in these two environments. Much of the learning in the classroom has emphasized "reading to learn" or learning materials to promote the retention of information. At work, 80% of the reading that takes place is "reading to do" or reading information that is applied towards completing a task, and then forgotten (Mikulecky, 1984).

Instructional methods applied in most classrooms have emphasized the skill-centered approach which presents skills in isolation. For many learners, when skills are taught out of context, they become too abstract and difficult to understand, apply, and transfer. In addition, most instruction in schools has been focused on individual progress while in the workplace, learning is most often a shared process (Resnick, 1987; Berryman, 1990).

Learning Theories That Support Workforce Literacy

Recent theories of learning address and support the position of teaching basic skills in the context of job applications (Mikulecky and Ehlinger, 1988). Work-related instruction simulates the literacy requirements of the workplace by:

(1. Creating problems encountered on the job and developing group processing/ communication towards developing solutions;

(2. Providing skill and strategy development and practice in reading from materials such as manuals, charts, tables, schematics, summaries, and forms workers need to complete job tasks; and

(3 Providing instruction and practice in completing forms, writing reports, summaries, and other forms of written communications encountered on the job.

A study by Scribner and Stevens (1989) suggests that math problem solving skills can be best learned and applied in the context of real life or work-related problems. The more practice learners are provided in solving math problems in a functional context, the more likely they will be able to transfer their skills to new situations.

Job-related instruction gives learners contact with and feedback about job literacy demands while introducing tasks needed to perform on the job. Participants learn new materials more efficiently as they use knowledge of their jobs to develop literacy skills. Education is made more meaningful as it elicits greater participation from learners who need to see the relevance of what they are learning (Mikulecky and Ehlinger, 1988).

Paper presented by Meg Keeley. National Conference of the American Vocational Association, 12/10/91

Recent studies (Carnevale, et.al., 1990, SCANS Report, Dept. of Labor, 1991) and others have identified the general competencies needed by workers as guidelines for developing curriculum. However, there are few commercial materials that address job skill applications to the extent needed for mastery learning and transfer of skills to the job. In addition, jobs are changing so rapidly, literature used previously to identify job skill requirements is fast becoming obsolete. This means that most programs interested in developing a workforce literacy program must develop customized instructional materials.

Fortunately, as interest in workplace literacy has grown in the Armed Services, vocational and job training programs and business, industry and labor, methodologies have emerged which can be adapted by most educators and curriculum writers to develop instructional materials that are customized to both the targeted learner population and the job.

Identifying the Skills Needed for the Workplace

De La Salle Vocational, a day treatment program for court-adjudicated youth, is developing customized curriculum that addresses the needs of both the learner and the workplace by providing instruction in the context of job applications. Based on methodology developed by Philippi (1991) and others, staff identify basic skills and their applications on the job through the process of "literacy task analysis".

In conducting a literacy task analysis, curriculum developers interview instructors and employers to identify critical tasks and skills required on the job. Programs which have advisory boards may utilize members to help set up this process in the workplace. Developers then observe and interview competent workers as they perform job tasks at the work site. Materials and forms used on the job are collected so that students may become familiar with job-related reading, writing, and math requirements.

In addition to assessing literacy skills, this process allows staff of job training programs to observe the social/work maturity and job-specific skills needed by participants to be successful in the workplace. This impacts in more accurate matching of learners to areas of training, more holistic instruction in work-related skills, and matching of program completers to appropriate jobs in the community.

Developing Curriculum

After careful analysis of critical job tasks, materials used on the job, and literacy task analyses, curriculum is developed which reflects the way these skills are used on the job. Developers must determine which literacy subtasks to include in instruction and determine how instruction should be organized and sequenced. Suggestions for organization include :

- Teaching skills in sequence using materials from the job as examples and practice, e.g., modules on vocabulary, reading graphs and charts, etc. with lap packs of specific applications developed for each shop area;
- Teaching skills as they are applied in the various processes of a job, e.g., modules for graphic arts on typesetting, lay-up, photo processing, platemaking, press operation, and bindery with materials emphasizing critical tasks in each area; and
- Teaching skills as they are applied in critical tasks by workers in occupational areas, e.g.,restaurant cook, hospital food service worker, food processing plant worker, grocery store worker, etc.

Paper presented by Meg Keeley. National Conference of the American Vocational Association, 12/10/91

Once the most appropriate format(s) for curriculum have been determined, lessons should be developed using job scenarios and problem solving situations based on observations of the workplace.

Lessons should provide instruction in strategies such as metacognition, how to access information from various written and graphic formats, how to study, and techniques for communication and problem solving. Strategies and skills should be practiced in simulations using job-related materials including training , policy and procedural manuals; specs, instructions, tables, charts, and other reference materials; job set up, quality control processes and other measurement/math applications; data analysis for decision making; form completion and report writing; and communication systems including telephones, computers, and other technology. By practicing skills in a variety of contexts related to the job, students will be empowered to become independent ,lifelong learners and be able to transfer the skills they learn to other job and life situations. They will enter the workforce as more competent and confident workers.

Applying Best Teaching Practices in Instruction

In order to incorporate best models of instruction and to address various learning styles and preferences, lessons should be written and presented in the following steps:

- Focus/Awareness
  Relate new learning to experiences in the classroom (film, hands-on project) or from students' experiential background. This creates a bridge to the new concepts, skills, and strategies being introduced. By drawing on what a learner already knows, you show respect for his knowledge and provide a context and motivation for learning. Studies indicate that students are better able to think at higher taxonomy levels when they have familiarity with a topic.

- Modeling
  Model the thinking processes of a competent learner or worker to show how to apply new learning. This helps students to reflect on their own ways of learning and to evaluate and develop thinking and monitoring skills (metacognition). It may be helpful to present more than one model since thinking processes may be dependent on learning styles and preferences, experiential background, or cultural differences.

- Group Practice/Cooperative Learning
  Provide paired or small group practice using scenarios from the workplace until learners demonstrate understanding of the new concept, etc. This reinforces communication and collaborative learning and thinking/problem-solving skills.

- Independent Practice and Assessment
  Provide independent practice to reinforce and assess learning. There should be sufficient opportunities to practice new learning so that it is mastered and applied in a number of ways so that it may be transferred to other situations. By working independently, students can process their learning more deeply, moving towards mastery learning. When students require individualized instruction or additional time or practice, this is an opportunity to meet their needs.

- Closure
  Learners should always be given the opportunity to summarize what they have l earned in their own words (either orally or in written form). This helps them to clarify their understanding and to remember what they have learned. When connected to job-related competencies, many students benefit from this

process by being better able to articulate what they know for job interviews.

Learner Assessment

A decision regarding eligible participants in a workforce literacy program must be made in the early stages of development. This kind of instruction is most appropriate for students reading at the 6th grade level or higher. (Adaptations may be made for lower level students. ESL/LEP and others if the majority of learners are in this category.) Most standardized tests are inappropriate for screening and/or assessment in a job-related skills program since they measure classroom type applications of skills ("reading to learn"). A cloze test, written at approximately 8th to10th grade reading level can be developed from training and policy manuals to identify potential participants and/or the appropriate readability level for instructional materials.

Learner needs assessment and evaluation should be based on competency in performing work-related skill applications. Pre- and posttests should be designed after instructional materials have been developed so that learners are assessed for skills included in their instruction. It is important to focus measurement of progress on the application of basic skills and strategies needed to perform job tasks, not on the content. Qualitative assessments may be gained through surveys of students, job trainers, employers and students.

Program Evaluation

Procedures for evaluating program effectiveness should be established during the planning stages of a workforce literacy program. Planners should determine what information is needed to assess the program and design and implement formats for record keeping. Evaluation processes should focus on questions regarding: (1) goals of the program and compatability with overall objectives and student needs; (2) how effectively materials and processes support program goals and match the needs of the workplace; (3) how effectively student progress is measured; and (4) how the program has affected students in terms of progress and competency in job performance. This process should clarify program goals and objectives, assist observations of outcome, and produce information that can be used to improve the program in the future.

Conclusions

Youth and adult learners in occupational training programs require a wide range of instruction towards job readiness. There is no one easy answer. However, research indicates that success is more likely for those preparing to enter or re-enter employment when basic skill instruction is integrated with occupational training. Studies indicate that participants in work-related basic skills programs are more motivated to learn skills that they can apply on a daily basis in their work and lives. By focusing on the skills and strategies needed to perform job tasks, learning is placed in a functional context as apposed to being taught as abstract concepts that are difficult to comprehend and transfer.

All program staff can gain valuable insight into the formal and informal skill requirements of the workplace by observing competent workers as they perform job tasks. By identifying the basic skills applied on the job, instructors can develop curriculum and instructional materials that not only better prepare their students for immediate employment, but provide them with skills that can be transferred to other jobs and life situations. Learners can go into the workforce with greater confidence that they have the skills they need to be successful workers and lifelong learners.

Paper presented by Meg Keeley. National Conference of the American Vocational Association, 12/10/91

SCANS Report for America 2000

Five Competencies

Resources: Identifies, organizes, plans, allocates resources
- Time
- Money
- Material and Facilities
- Human Resources

Interpersonal: Works with others
- Participates as Member of a Team
- Teaches Others New Skills
- Serves Clients/Customers
- Exercises Leadership
- Negotiates
- Works with Diversity

Information: Acquires and uses information
- Acquires and Evaluates Information
- Organizes and Maintains Information
- Interprets and Communicates Information
- Uses Computers to Process Information

Systems: Understands complex inter-relationships
- Understands systems
- Monitors and Corrects Performance
- Improves or Designs Systems

Technology: Works with a variety of technologies
- Selects Technology
- Applies Technology to Task
- Maintains and Troubleshoots Equipment

Three-Part Foundation

Basic Skills:
- Reading
- Writing
- Arithmetic/Mathematics
- Listening
- Speaking

Thinking Skills:
- Creative Thinking
- Decision Making
- Problem Solving
- Seeing Things in the Mind's Eye
- Knowing How to Learn
- Reasoning

Personal Qualities:
- Responsibility
- Self-Esteem
- Sociability
- Self-Management
- Integrity/Honesty

APPLICATIONS OF READING SKILLS FOUND IN THE WORKPLACE

Vocabulary:
- Recognizing common words and meanings, task-related words with technical meanings, and meanings of common abbreviations and acronyms.

Literal Comprehension:
- Identifying factual details and specifications within text, following sequential directions to complete task, and determining the main idea of a paragraph or section.

Locating Information Within a Text:
- Using table of contents, index, appendices, glossary, systems or subsystems.
- Locating pages, titles, paragraphs, figures, or charts needed to answer questions or solve problems.
- Skimming or scanning to determine whether or not text contains relevant information.
- Cross-referencing within and across source materials to select information to perform a routine.
- Using a completed form to locate information to complete a task.

Comparing and Contrasting:
- Combining information from multiple sources that contribute to the completion of a task.
- Selecting parts of text or visual materials to complete a task.
- Identifying similarities and differences in objects.
- Determining the presence of a defect or extent of damage.
- Classifying or matching objects by color, size, or significant marking.
- Distinguishing between relevant and irrelevant information in text or visuals.

Recognizing Cause and Effect; Predicting Outcomes:
- Using common knowledge for safety.
- Applying preventative measures prior to task to minimize problems.
- Selecting appropriate course of action in emergency.

Using Charts, Diagrams, Schematics:
- Reading two-or more column charts to obtain information.
- Locating chart information at intersections of rows and columns.
- Cross-referencing charted material with text.
- Applying information from tables or graphs to locate malfunction or select actions.
- Using flow charts and organizational charts to sequence events, arrive at a decision, or problem solve.
- Identifying components within a schematic.
- Isolating problem components in schematics, tracing to cause of problem, and interpreting symbols.
- Identifying details, labels, numbers, parts of an illustration, parts from a key or legend.
- Following sequenced illustrations as a guide.
- Interpreting three dimensional drawings of objects for assembly or disassembly.

Inferential Comprehension:
- Determining meaning of figurative, idiomatic, or technical usage of terms, using context clues as reference.
- Making inferences from text; organizing information from multiple sources into a series; interpreting codes and symbols.

(Philippi, J.W. 1988 Matching Literacy to Job Training: Some Applications from Military Programs. Journal of Reading, Vol. 31, No. 7, pp. 658-666. Newark, DE: International Reading Association.

APPLICATIONS OF WRITING SKILLS FOUND IN THE WORKPLACE

Production:
- Writing key technical words accurately on forms
- Spelling task-related words and abbreviations correctly.

Information Transfer (Single Step/Source):
- Entering appropriate information onto a form.
- Recording essential information that involves more than one sentence.
- Recording essential information in phrases or simple sentence form accurately and precisely.

Information Transfer (Multiple Steps/Sources):
- Transferring numbers, codes, dates, figures from equipment or written sources onto appropriate sections of forms.
- Writing a report including necessary support documentation or classification.

Translation:
- Writing brief, descriptive accounts of activities or transactions performed.
- Outlining a situation by identifying key ideas and supporting details.
- Summarizing essential details for a written communication, using a problem-solving or news-writing heuristic.
- Selecting relevant details for a written communication.
- Stating general impressions of an event or situations as they relate to specific reporting goals.
- Summarizing events and precise dialogue in an accurate, complete, and objective manner.
- Summarizing the major points presented in a written communication.
- Generating a written communication according to a specific format (e.g., memorandum, telex, or letter).

Extension/Interpretation:
- Identifying objectives, intent, target audience, and all essential and supporting details of a written communication.
- Generating a written communication, arranging events sequentially.
- Writing brief justifications for actions taken and providing good reasons for rejecting alternative actions.
- Appraising a written communication and making adjustments to improve clarity.

(Compiled from studies by Mikulecky, 1982; Mikulecky, Ehlinger, and Meenan, 1987; U.S. Army, 1988; Philippi, 1988. Source: Philippi, J.W. 1989 Basic Skills in the Workplace, in Nadler, L. and Nadler, Z., eds., Handbook for Human Resource Development, Second Ed., College Park MD: J. Wiley & Sons)

APPLICATIONS OF COMPUTATION AND PROBLEM-SOLVING SKILLS

IN THE WORKPLACE

Whole Numbers:
- Read, write, and count single and multiple digit whole numbers.
- Add, subtract, multiply, and divide single and multiple digit numbers.
- * Use addition, subtraction, multiplication, and division to solve problems with single and multiple digit whole numbers.
- * Round off single and multiple digit numbers.

Fractions:
- Read and write common fractions.
- Add, subtract, multiply, and divide common fractions.
- * Solve problems with common fractions.

Decimals:
- Carry out arithmetic computations involving dollars and cents.
- Read and write decimals in one and more places.
- * Round off decimals in one and more places.
- Add, Subtract, multiply and divide decimals in one and more places.
- * Solve problems with decimals in one and more places.

Percents:
- Read, write, and compute percents.

Mixed Operations:
- * Convert fractions to decimals, percents to fractions, fractions to percents, percents to decimals, common fractions or mixed numbers to decimal fractions, and decimal fractions to common fractions or mixed numbers.
- * Solve problems by selecting and using correct order of operations.
- Perform written calculations quickly.
- Compute averages.

Measurements and Calculation:
- * Read numbers or symbols from time, weight, distance, and volume measuring scales.
- * Use a measuring device to determine an object's weight, distance, or volume in standard (English) units or metric units.
- * Perform basic metric conversions involving weight, distance, and volume.
- * Use a calculator to perform basic arithmetic operations to solve problems.

Estimations:
- * Determine if a solution to a mathematical problem is reasonable

(* indicates skills directly involved with using problem-solving strategies or interpretation.)

(Compiled from studies by Greenan, 1984; Philippi, 1988. Source: Philippi, J.W. 1988. Job Literacy: Computation and Problem Solving. Report for U.W. Department of Labor and American Society for Training and Development. Alexandria, VA: ASTD.

COMMUNICATION AND INTERPERSONAL SKILLS

APPLIED IN THE WORKPLACE

SPEAKING

- Using appropriate vocabulary or technical terms and pronouncing words correctly.
- Modifying style and/or content based on audience (supervisor, peer, customer).
- Using appropriate body language, tone and pitch to communicate meaning.
- Using appropriate manner and technique in using telephone.
- Repeating or summarizing information accurately.
- Reporting information in an organized, logical manner.
- Describing a situation or item accurately.
- Formulating questions to elicit additional needed information.

LISTENING

- Identifying procedures and directions.
- Understanding general and technical concepts/relationships.
- Identifying the main idea or key issue.
- Identifying specific details that support a key idea.
- Drawing conclusions from the information stated.
- Identifying what additional information is needed for clarity.
- Detecting problems by comparing noises in machinery or comparing information to detect faults in logic.
- Understanding and clarifying requests,complaints,safety instructions,warnings.
- Accurately interpreting body language, tone, and pitch.
- Determining when a response is needed or desired.
- Giving feedback that demonstrates understandingand/or interest.

INTERPERSONAL SKILLS

- Using assertive rather than aggressive communication styles.
- Understanding importance of timing and location in approaching others.
- Coping with inappropriate or undesirable behavior in others.
- Dealing with stress in self, others, and situation.
- Tolerating ambiguity.
- Generating a variety of possible solutions to a given problem.
- Placing responsibility for the problem with the appropriate party.
- Focusing on interests, not positions ("win-win" rather than "win-lose").
- Using objective criteria in judging ideas and selecting solutions.
- Identifying with and making statements that express understanding and empathy with personal experiences, feelings, and attitutdes expressed by others.
- Providing and receiving focused feedback.

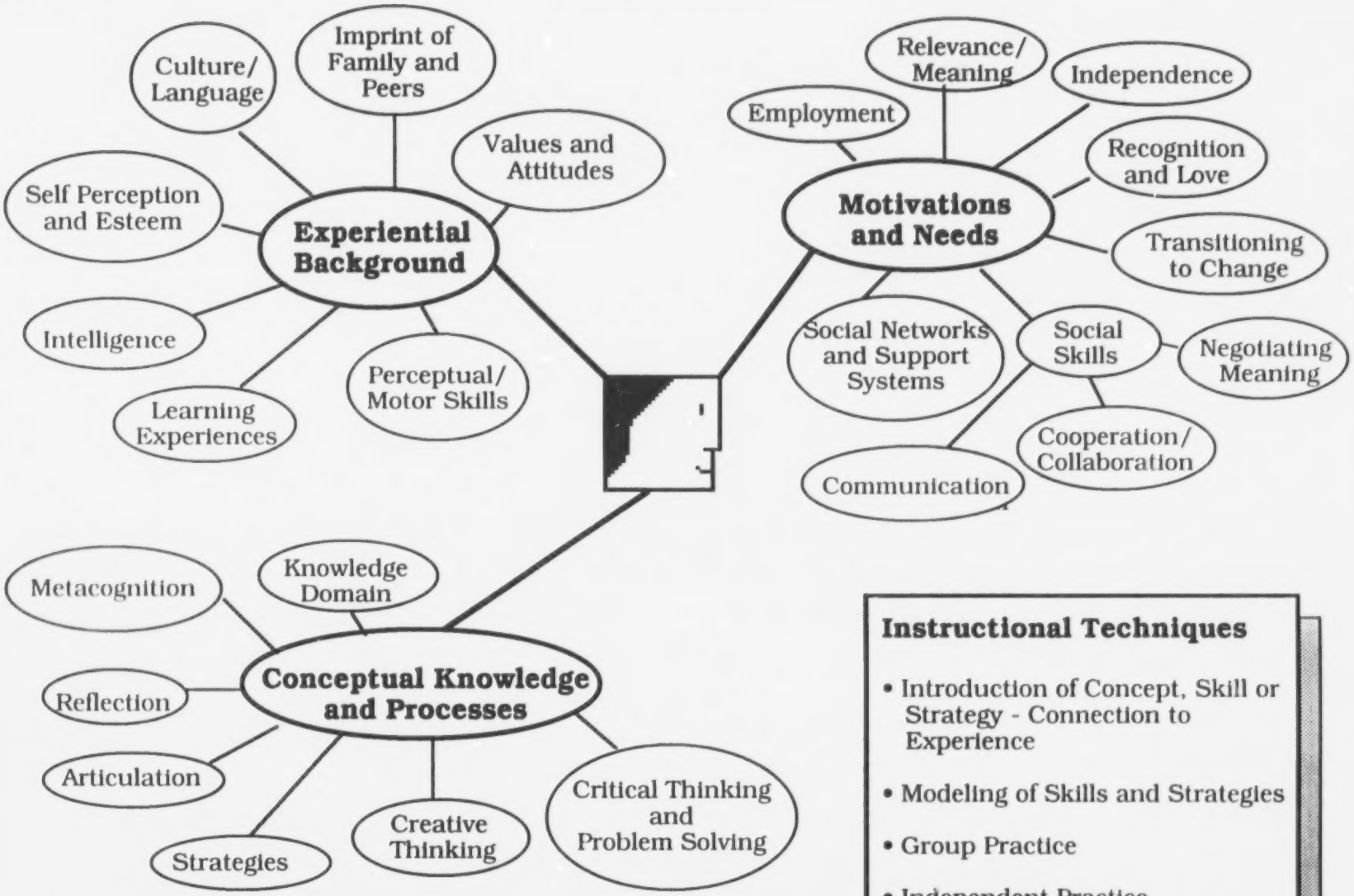
Adapted from Hull and Sechler (1987); and Miller, P.F. and W.T. Cody, (1986)

LITERACY TASK ANALYSIS

Job Classifications: Installer, Auto Mechanics
Job Task: Exhaust installation

Job Subtasks	Literacy Skill Applications
1. While motor running, open hood and smell for gas, look for drips (leaks)	1.1 Follow written procedure 1.2 Comparison/contrast
2. Read sticker on hood or door panel - year and engine size to determine parts needed	2.1 Read label - scan for relevant details 2.2 Write notes on above
3. Engage safety locks, then raise auto on lift to inspect under car - Observe smells, leaks, condition of parts and conditions. If leak, can't use torch - would explode.	3.1 Comparison/contrast 3.2 Write down observations 3.3 Make predictions based on observations/experience
4. Take notes to manager. He'll go over to make estimate and check inventory for parts	4.1 Oral summary from written notes
5. Speak with customer on phone or walk through problems and make recommendations. Fill out inspection report.	5.1 Summarize problems/predict solution with customer 5.2 Scan for relevant sections 5.3 Complete relevant sections, transfer information from notes
6. Get parts needed from stock. (Manager will use computer system to check for availability of parts.) If not there, can't do job. Check new parts for defects	6.1 Scan for relevant information 6.2 Comparison/contrast - numbers of parts available, defects
7. Take out old parts. May need to use torch or air ratchet depending on condition of parts. Double check on condition of hangers.	7.1 Follow written procedure 7.2 Comparison/contrast- determine tools needed 7.3 Making predictions
8. Lay out parts in order taken off. Compare with new parts as check that parts are correct	8.1 Sequencing 8.2 Comparison/contrast by appearance
9. Install new parts - determine order by exhaust flow and way parts fit together.	9.1 Determine sequence, spatial relationships, and procedure
10. Bring auto down from lift. Road test, if necessary.	10.1 Follow procedure
11. Complete inspection report and hand in to manager	11.1 Complete form in appropriate sections

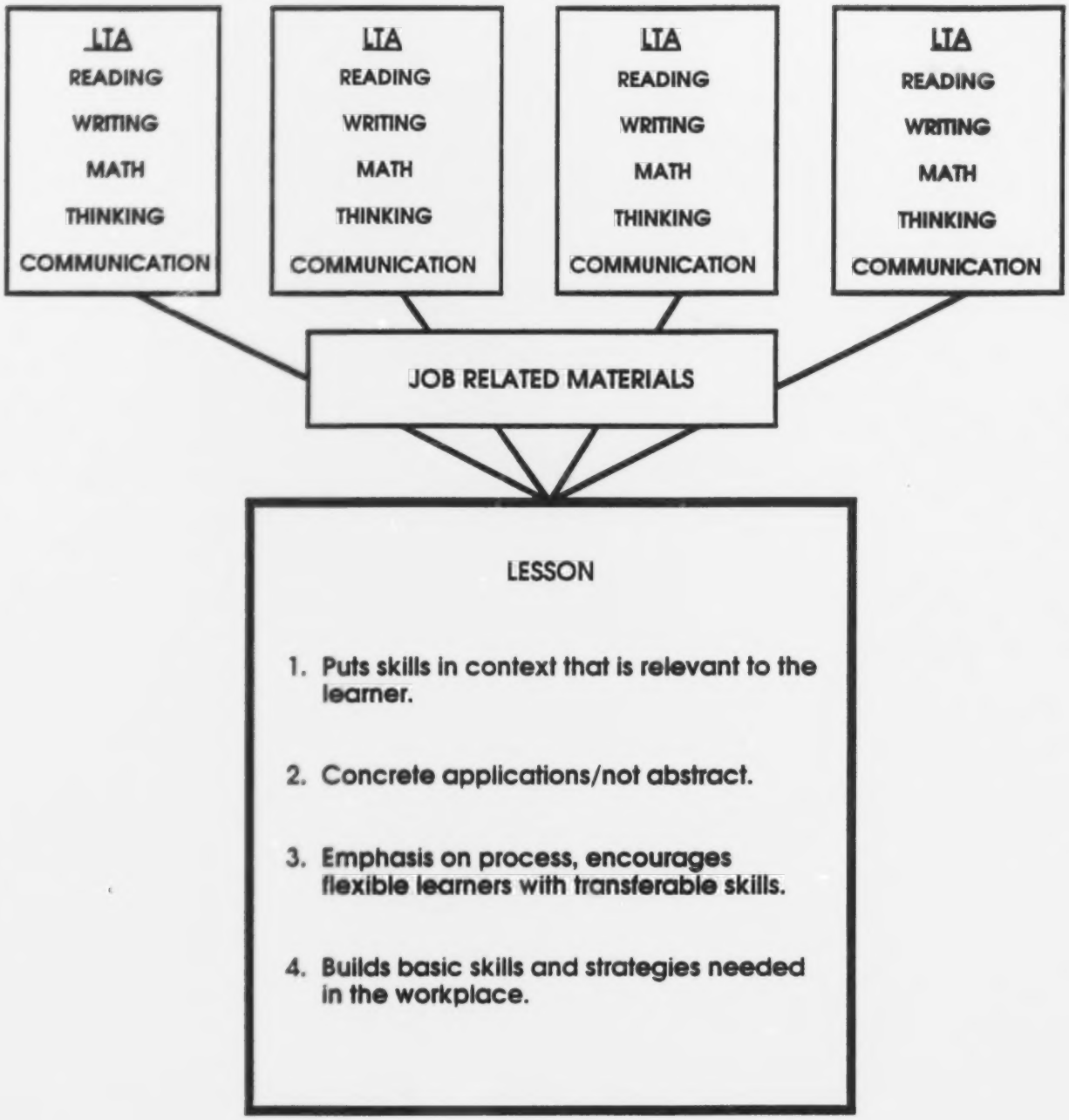
The Learner



Instructional Techniques

- Introduction of Concept, Skill or Strategy - Connection to Experience
- Modeling of Skills and Strategies
- Group Practice
- Independent Practice
- Closure

PROCESS OF CURRICULUM DEVELOPMENT



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Curriculum Outline

Using training materials
- Vocabulary
- Study skills - SQ3R, note taking, studying for tests, metacognition

Orientation
- General policies and procedures
- Procedural directions
- Job descriptions/evaluation processes
- Forms - income tax, benefits, etc
- Scheduling - time management

Assessing the job/problem
- Communication skills- customer, supervisor, peers
- Observing details/Understanding systems and theory and relationships
- Comparison/contrast with standard
- Problem solving - using troubleshooting charts, team approaches

Using resources
- Manuals, charts, tables, specs, etc.
- Inventory, catalogs, ordering forms - ordering/sequencing

Using tools/operation of machinery
- Safety procedures - MSDS sheets
- Procedural directions/illustrations

Set up operations
- Referral to directions, specs, etc.
- Reading memos, work orders, etc.
- Measurement - checking for accuracy

Running the job/Quality control
- Checking for accuracy/making adjustments - comparison/contrast
- Record keeping - i.e. SPC, work order
- Analyzing data for problem solving - charts, graphs, etc.
- Problem solving skills - team communications

Report Writing
- Summarizing work orally or in writing
- Form completion/data entry

Career Development
- Employment search skills
- Transition from school to work
- Attitudes for keeping a job
- Resources for career development/further education

AUTO MECHANICS CURRICULUM

I. Diagnosing the Problem
- A. Evaluating customer input - listening skills
- B. Diagnosing the problem - observing
- C. Using reference materials - reading
  1. Work order - locating information (scanning)
  2. Service manuals - contents, index, illustrations
  3. Manufacturers specs - tables and charts

II. Checking Systems and Testing Components
- A. Understanding automotive systems - cause and effect/preparing for certification tests
- B. Understanding and applying scientific principles
  1. Simple machines
  2. Friction
  3. Heat and expansion of metals and gases
  4. Pressure - effects on gases and fluids

III. Checking and Removing Parts
- A. Sequencing parts for disassembly and assembly
- B. Prioritizing problem areas
- C. Following directions for cleaning and inspecting parts - comparison/contrast
- D. Reading troubleshooting charts

IV. Ordering New Parts
- A. Using a parts catalog - contents, index, etc.
- B. Understanding codes/reading tables
- C. Sequencing parts on an order form
- D. Filling out an order form
- E. Using the phone for placing orders

V. Replacing Parts and Adjustments
- A. Sequencing - following directions and specs
- B. Testing - comparison/contrast with standard
- C. Adjustments - problems solving/decision making
- D. Clean up- using solvents/reading directions

VI. Paper Work and Record Keeping - Reading and Writing Skills
- A. Work Order
- B. Warranty
- C. Time sheets/cards
- D. Flat Rate Manual
- E. Estimate Sheet
- F. Daily Shop Schedule
- G. Preventative Maintenance Sheets and Schedules
- H. Inventory Records

VII. Safety Issues
- A. MSDS Sheets /API Codes- locating information, following directions
- B.. Vehicle Safety Reports
- C. First Aid
- D. Fire
- E. Tool Use
- F. State Inspection
- G. Driver's safety - liability issues

USING THE VEHICLE INSPECTION REPORT

You have been observing other workers and received training on how to install an exhaust system. Today, you have been given your first job.

While inspecting an '86 Chevy Malibu, you took notes on the problems you observed and the parts you will need to replace. You consulted with your manager and he has gone over your notes and inspected the car. He agrees with your findings. He has given you a *Vehicle Inspection Report* with the part numbers you will need to get from inventory.

The first thing you should do when you receive this form is to check to be sure it matches the job you are doing.

Is this form the one you need to work on the Chevy Malibu? _____

☞ Before using a form such as the *Vehicle Inspection Report*, you should always **set your purpose before you read**. Ask yourself, "What information do I need from this written material or form. Then develop some questions that will help you to focus on the important information you need to know.

What information do you need to find on this form?

_____

_____

☞ **Organization of Forms:** Before you read a form, you should first determine how it is organized. Most forms are arranged to help you find the information you need quickly and easily. On the job, you don't have a lot of time to waste getting this information, so you should know what to look for before you start reading.

Notice that this form is organized by types of jobs that are done by Speedy Muffler King®: exhaust systems, suspension, and brakes. What other types of information is found on this form?

_____

_____

_____

_____

What category will you look under to do the Chevy Malibu?

_____

What details will you find under the category of exhaust systems?

_____

What do you think L/R stands for? _____

What do you think the numbers in that column represent?

_____

Under what category are the parts numbers listed?

_____

How do you know what the codes stand for?

_____

What does N stand for? _____

What code should be used for *inner*? _____

What code would be used for *repack*? _____

What do you think the difference is in the terms *needs replacing* and *recommend replacing*?

_____

_____

Experienced workers use a reading technique called **scanning**. When you scan, you focus on **key words** and skip over the information that you don't need.

What key word would you scan for based on the job?

_____

When you took your notes, you wrote down the parts that need to be replaced. They are:

3 clamps _____

4 bolts _____

1 extension pipe _____

1 converter _____

1 muffler _____

1 flange _____

1 tail pipe _____

Are all of these parts listed on the *Vehicle Inspection Report*? _____

To scan for the part number of the bolts you need, focus on the number 4 since it is different from the others. Or scan for the word *bolts*. To do this, run your finger down the column to the word *bolt* or the number 4.

Next, run your finger across the column under *Comments* to locate the part number. The part number is E-1071.

Now you try it! Write the part number on the lines above for each of the parts listed above. Notice that these lists are not in the same order.

When you complete your list, check your answers with another student. When you're certain that you've gotten them correct, you'll be ready to get your parts from the stock room!

FORECAST READABILITY EXERCISE

(The one-syllable words are underlined)

Friction is the resistance to motion created when one dry surface rubs against another. Even highly polished metal surfaces have irregularities (when studied under a microscope) that would create much friction if rubbed together. The microscopic roughness would resist movement and create heat.

As the relatively rough projections on the contact surfaces rub across each other, they eventually would break off and become loose particles. The particles, in turn would work between the surfaces and gouge grooves in the metal. Then, as the friction and heat increases, the metal parts would expand, causing greater pressure between the surfaces and creating even greater friction. This condition of wear exists until the parts either weld themselves together or seize (expand so much that mating parts cannot move).

In some cases the excessively worn parts lose so much material from their contact surfaces, they become too loose to function properly. When this happens (150) the scored part should be replaced with a new one.

From: Roth, A.C. (1981). Small Gas Engines, South Holland, IL: Goodheart-Willcox Company, Inc.

FORECAST READABILITY FORMULA WORKSHEET

1.)	Number of 1-syllable words.	82	
2.)	# 1 divided by 10	8.2	
3.)	#2 subtracted from 20	11.8	(approximate readability index of this passage)

DESIGNING ALTERNATIVE ASSESSMENT TOOLS

THE CLOZE READABILITY PROCEDURE

A cloze test can be made from any prose passage. The length of the passage may be determined by the number of words a reader at a certain ability level can read in a specified period of time. A passage of 100-150 words of prose, excerpted from printed job materials, (e.g., an employees' handbook or benefits brochure), provides a good basis for cloze test development for functional context workplace programs.

The following guidelines should be adhered to when constructing a cloze test:

1. Each passage should begin at the normal beginning of a paragraph. Determine the readability level of the passage prior to its use in constructing a cloze test. Use passages which learners have not read from

2. Every nth (e.g., fifth) word in the passage is deleted and replaced by underlined blanks of a standard length. (Make no deletions from the first or last sentences in the passage.)

3. Instruct learners to read the entire passage through, then to write in each blank the word that they think has been deleted. This is an untimed activity.

4. Exact match responses are scored as correct (do not count minor misspellings as errors.) If entered words are semantically and syntactically equivalent synonyms, they may be counted as correct at the administrator's discretion. (This is especially appropriate for ESL learners.)

5. The results of the cloze test determine the suitability of materials for use with learners who have been tested with the cloze. Cloze tests correlate with standardized reading tests at approximately r=.90 levels. The equivalence of cloze scores to comprehension scores are as follows:

% cloze blanks correctly filled	% of comprehension items correct
55%+	95%
40%	80%
35%	65%

For purposes of learner use of materials, any cloze score above 55% indicates an ability to use materials independently; any score between 40% and 55%, with the help of an instructor; and any score below 40%, with extreme frustration.

Auto Mechanic Cloze Test

The Muffler

A muffler is the part of the overall exhaust system which is designed to quiet or "muffle" engine noise. _____1_____ engines can produce a _____2_____ of explosions from 1,200 _____3_____ more than 15,000 times a _____4_____. The resulting sound _____5_____ blast out of the _____6_____ along with high pressure _____7_____ and water vapor. A _____8_____ must contain and control _____9_____ continuous noise, heat, and _____10_____: and allow the gas to _____11_____ through and yet control _____12_____ pressure. Excessive back pressure _____13_____ as a brake to _____14_____ down power and performance. _____15_____ back pressure decreases power _____16_____ increases engine wear. To _____16_____ its job properly, a _____17_____ must be specifically designed _____18_____ each application: inside design _____19_____ sound control and engine _____20_____; and outside design for _____21_____ and conformation to the _____22_____ underbody. Inside a muffler _____23_____ are chambers, partitions, louvred _____24_____ and solid tubes. These are balanced to absorb sound pulses while moving the gases/vapors smoothly through and out of the system.

This test was adapted from materials developed by Speedy Muffler King ®, written at approximately 10.9 level.

DIAGNOSING THE PROBLEM

PRETEST

Directions: **Write the letter of the best answer for each of the questions below on your answer sheet.**

Refer to the *Vehicle Inspection Sheet* on the following page to answer questions 1-5.

1. The vehicle you will be working on is a:
   a. 1989 Buick Riviera
   b. 1987 Cutlas Supreme
   c. 1987 Pontiac Bonneville
   d. 1989 Chevy Beretta

2. According to this work order, you are to replace parts for the:
   a. exhaust system
   b. brakes
   c. suspension
   d. exhaust and brakes

3. The code N stands for:
   a. not inspected
   b. needs replacing
   c. not available
   d. not replaceable

4. The muffler part number you must find is:
   a. E-1094
   b. 47510
   c. 17840
   d. E-1071

5. You will need to get how many of the part no. E-1071?
   a. 3
   b. 1
   c. 2
   d. 4

CIPP Program Evaluation Model

Context

- How have the goals of program instruction been defined?
- Is there a clear written statement to which all participants, instructors, and key program personnel subscribe?
- What are the beliefs about workforce literacy promoted by the program?
- Are those beliefs documented and accepted by those who are a part of the program?
- Are those beliefs supported by current theory and research?
- Is there a clear written statement of the program's operational objectives that delineates on how instruction is to occur?
- Is the workforce literacy program as defined compatible with the needs and characteristics of the participants and overall program objectives?

Input

- Are the workforce literacy materials consistent with the philosophy and stated goals?
- Are there adequate materials available for the workforce literacy program?
- Do the workforce literacy instructional materials work?
- Are they interesting, easy-to-use, and cost effective?
- Do the workforce literacy materials and instructional techniques accommodate the literacy levels of participants?
- Are instructors adequately trained to implement the workforce literacy program?
- Are effective support services readily available to participants who need them?
- Is the learning facility planned and equipped to support the workforce literacy program?
- Is the workforce literacy program recordkeeping system complete, simple, and sufficient?

Process

- Has instruction been developed that is based on the findings from Literacy Task Analysis of critical job tasks?
- Do routine program activities reflect stated program goals?
- Are current records of these activities maintained in the workforce literacy program?
- What are each participant's current progress, instructional activities, and learning needs?
- Among instructors who have similar responsibilities, are instructional decisions and activities generally consistent?
- Are participants making the progress that was anticipated?
- How is their progress determined?
- How much instructional time is spent in whole-group, small-group, and individual formats?
- Are the planned-for workforce literacy resources actually being used?
- Is there a need for additional resources not initially planned for?

Product

- Do participants continue to use skill applications after they leave class?
- Do they apply their new learning to the performance of critical job tasks?
- Do they view the skill applications as being useful?
- Is each participant acquiring the skill applications for critical job tasks that were identified in Literacy Task Analyses?
- Is progress satisfactory?
- Has performance in job or occupational skill training improved?
- Has program retention improved for participants in the workforce literacy program?
- Has job retention improved in graduates who completed the workforce literacy program?

Adapted from: Literacy at Work by Jorie Philippi, Simon and Schuster Workplace Resources, 1991.

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